



The Iron-Making Process

The Ingredients

The four main ingredients for making iron were present in the area of Hopewell and were a reason for the furnace's location.

I. Wood

- A. Used as a primary energy source in village operations
 - 1. As charcoal to power the furnace and blacksmith shop
 - 2. As fuel for heating and cooking
- B. Used as building material for:
 - 1. Homes
 - 2. Wagons and equipment

II. Water

- A. Used to turn the water wheel connected to the bellows which forced blasts of air into the furnace to increase the heat
- B. Used for:
 - 1. Drinking
 - 2. Bathing
 - 3. Cooking
 - 4. Washing
 - 5. Cleaning

III. Iron Ore

Iron ore was dug from open-pit mines near Hopewell, then hauled to Hopewell Furnace in carts and wagons

IV. Limestone

Used as a "flux," which removed impurities from the ore as the iron ore was smelted; it was quarried near Morgantown and from Hopewell Plantation lands

The Process

This process was also called smelting.

- I. In the furnace, the charcoal burns with a great amount of heat.
- II. The water wheel was attached to a huge bellows and later to blowing tubs — like can be seen at Hopewell today — which blasted the charcoal with air to increase the heat.
- III. The furnace was filled, or "charged," from the top in this order:
 - A. Fire
 - B. Charcoal

- C. Iron Ore
 - D. Limestone
 - E. Charcoal
 - F. Iron Ore
 - G. The process continued and repeated as the ore melted
- IV. When heated, limestone becomes gummy. It picks up the impurities and floats to the top of the molten iron. It acts as a cleaning agent. When cooled, the combination of impurities and limestone is called slag. [*Safety Note:* Hills of slag, a waste material, are still visible at the site. Slag is rough and sharp — it cuts skin easily! Students should be advised to stay away from slag piles.]
- V. The heavy molten iron sinks to the bottom of the furnace.
- VI. The molten iron collects there until the founder decides it is time to “tap” or drain off the furnace.
- VII. The furnace was tapped approximately every twelve hours and the molten iron allowed to flow into trenches on the floor of the casting house. When cooled, these rough castings were bars of iron called “pigs.” These pigs were then sent to forges to be forged or hammered into other iron products.
- A. The name, “pigs,” comes from the shape of the trenches which resemble a sow feeding her piglets.
 - 1. The main trench is called the “sow”
 - 2. The branch trenches are called “pigs”
 - B. Pig iron was Hopewell’s principle product throughout its history
- VIII. Molten iron was also poured into molds made of wet sand to make stove plates and a variety of other iron products.
- A. During the 1830s, stoves were the most manufactured product at Hopewell Furnace — over 80,000 were made.
 - B. Other iron products were cast at Hopewell:
 - 1. Pots
 - 2. Irons
 - 3. Ironstands
 - 4. Hammers
 - 5. Anvils
 - 6. Dutch Ovens
 - 7. Lids
 - 8. Wheels
 - 9. Baking Plates
 - 10. Tea Kettles
 - 11. Screws
 - 12. Pans
 - 13. Cannons
 - 14. Prison Bars
 - 15. Sash Weights
 - 16. Clock Weights
 - 17. Shot & Shell
 - 18. Franklin Fireplaces